The book is really an introduction to medical physiology, and might be of service to one who desires to become a professional nurse, but is quite unsuited to the requirements of the "V.A.D." or emergency nurse. R. T. H.

The Student's Handbook of the University and Colleges of Cambridge. Seventeenth edition. Pp. vii+717. (Cambridge: At the University Press, 1918.) Price 6*s.* net.

THERE are three important additions to the present issue of this very useful handbook. First, the regulations for the new diploma in Oriental languages; secondly, the new regulations for the Classical Tripos and the Oriental Languages Tripos; and thirdly, the regulations for the newly established Nita King research scholarship to encourage research in the etiology, pathology, and prevention of fevers.

An account is also given of the new Parliamentary franchise for the University established by the Act of this year. The war has, of course, occasioned temporary emergency legislation on the part of the University authorities, and the various enactments are duly summarised.

Parents and intending students will find here all the information they seek concerning the University and the different colleges.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

The Late Mr. R. P. Gregory.

IN supplement to Prof. Seward's sympathetic notice of the late Mr. R. P. Gregory in NATURE of November 28, I venture to add a few words as to the peculiar interest of his genetic work. Mr. Gregory was at first associated with me in the proof that the familiar heterostylism of Primulas is an allelomorphic phenomenon. He next undertook a laborious inquiry into the sex-polymorphism of *Valeriana dioica*, but, in spite of much experiment, the case proved intractable, and little positive result was reached. About this time he declined a lucrative post which would have, as he feared, meant the practical abandonment of research, and, undeterred by a rather disappointing experience, he attacked several problems met with in the genetics of *Primula sinensis,* to which he devoted his spare energies for many years. Mr. Gregory there encountered a group of facts of surprising novelty and importance, which were described in outline in Proc. Roy. Soc., 1914, vol. lxxxvii.B, p. 484. Certain plants known in horticulture as "giants" have all their organs of very large size, and two races of these are, as he proved cytologically, tetraploid, containing four times (forty-eight) the haploid number (twelve) of normal plants. Breeding from such plants, he found that they are actually endowed with four sets of Mendelian factors instead of the usual two sets proper to biparental inheritance. Various paradoxical consequences were, therefore, theoretically possible, and several of these, as he demonstrated, do occur.

Such tetraploid plants are known to have arisen *de novo* on two separate occasions (once in his own work and once at Messrs. Sutton's, to whom he was indebted for many facilities) from diploid parents, but, as Mr. Gregory discovered, they were incapable of breeding with the races from which they were derived—a fact hitherto unparalleled and indubitably of great significance. When war broke out he became involved in military duties, eventually going out to France and being rather badly gassed. For technical reasons the study of the "giants" had to be suspended, but he kept always in touch with the Primula work, which we maintained for him so far as possible. The purpose of the later experiments was to test the theory that the numerous linkages are indications of successive somatic segregations, a view to which he strongly inclined in preference to current interpretations based on cytological appearances, and he believed that support for the somatic theory was already in some measure provided by his own observations. He left a mass of records bearing on this question, which we hope eventually to publish, but the character and soundness of his work even in its imperfect state give it classical value. W. BATESON.

The John Innes Horticultural Institution,
Merton, S.W.19.

Cyclonic Circulation.

IN consideration of the theoretical or "gradient" wind associated with any system of isobars where the curvature of the path is taken into account, a point of some interest appears to have been generally overlooked in the past. In the steady state the equation connecting V, the velocity of the gradient wind, with γ, the pressure gradient, is $\gamma/D = 2\omega V \sin\phi \pm V^2 \cot\rho/R$, where D=density of the air, ω=angular velocity of the earth, ϕ=latitude, R=radius of the earth, and ρ=angular radius of the small circle which forms the path of the air at the time.

The positive or negative sign is to be taken according as the path is concave or convex to the low-pressure area. For any given pressure gradient and curvature of path there will be two roots for V from this equation—that is, two different velocities, real or imaginary, will satisfy the dynamical conditions. The interesting case where the roots are imaginary has been dealt with by Gold in his discussion of this question some years ago (Meteorological Office, Official Publication No. 190, 1908). In the ordinary cyclones and anticyclones with which we are familiar V has the value given by the smaller numerically of the two real roots, and the conditions pertaining to the larger root seem to have escaped attention.

To take a numerical example, let $\rho=3^\circ$ and $\phi=55^\circ$; then, adopting the normal value for the density D, the equation becomes $\pm V^2 + 40{\cdot}7.V - 275\gamma = 0$ after conversion to the units m./sec. for velocity and mb. per 100 km. for pressure gradient. To deal first with the case of curvature convex to the "low," where the negative sign must be taken; putting $\gamma=1$ mb. per 100 km., the two roots for V become 9 and 31 m./sec. Both roots have the same sign, and correspond with clockwise rotation in the northern hemisphere. In this case (anticyclonic motion) the larger of the two roots does not seem to represent a stable state, and any perturbation would lead to a modification of the whole pressure distribution. This value is not, therefore, of practical interest. The lower value, 9 m./sec., is that which is met with in practice.

In the case of a path concave to the "low," the two roots for V are of opposite sign. The values corresponding with the above pressure gradient are $V=6$ and -46—that is, $V=6$ m./sec. for normal counter-clockwise rotation, and $V=46$ m./sec. for rotation in the opposite direction, *i.e.* clockwise in the

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northern hemisphere. The second, as well as the first, of these roots appears to represent stable conditions, and thus a depression revolving with high speed in a clockwise direction in the northern hemisphere is dynamically possible. In practice evidently such a condition could not get started on a large scale, as the rotation of the earth would inevitably cause the turning movement to commence in the normal direction. On a small scale, however, eddies round corners of houses or precipitous headlands might evidently be set up with revolution in either direction. It appears from the above that such rotation once started may, under favourable conditions, persist and develop into a dust whirl or tornado, with revolution either clockwise or counter-clockwise according to the direction of the initial impulse. One cannot impress too strongly on all observers of such phenomena the importance of noting in which direction the rotation is taking place. J. S. DINES.

66 Sydney Street, S.W.3, December 5.

Fuel Economisers.

WITH regard to the fuel economiser designed by Prof. C. V. Boys, and described in NATURE of November 28 (p. 249), I may mention that I have lately been making experiments in the same direction. In the arrangement tested by me the economiser consisted of a large rectangular metal box fixed over the upper part of the grate. The products from the fire were led by a horizontal flue above the fire into the lower part of the box, in which they ascended and heated it, after which they were drawn back to the chimney by a flue over the one by which they entered. The result was a considerable increase in the efficiency of the fire, but on removing the box to make some check readings under ordinary conditions it was found that the arrangement was impracticable. The flues were so coated with soot that it was evident that the box would require to be too frequently taken out for cleaning to make it worth adopting; and I fear Prof. Boys's arrangement will be liable to the same disadvantage. I should, however, mention that the coal used by me was not good, and was very smoky.

With regard to the objectionable appearance of these economisers, I may state that their appearance can be improved by painting them with suitable colours, as it is not necessary to use black. All paints—with the exception of aluminium—with which I am acquainted radiate equally well for heat of wave-lengths given out at the temperatures employed. White, or any colour, is as good as black for the purpose. The same remarks apply to colours with which hot-water radiators may be painted. The colour which harmonises best with their surroundings may be used without reducing their efficiency.

A great deal of the heat lost in the ordinary loosely fitted-in fire-grate might be saved if the fitting in was modified in the following way:—The bottom of the chimney is closed by a large sheet of metal, so as to make the fireplace-opening into a closed chamber; the grate is drawn forward two or three inches to allow of free circulation of air into and out of this chamber at the back of the grate, while the fire is provided with a chimney passing through the sheet of metal forming the roof of the chamber. By this arrangement the air heated by the hot back of the grate, which now goes up the chimney, would be sent into the room. In new grates it might be advisable to increase the amount of heat communicated to the grate by the fire, and also to increase the back surface of the grate by projections, flanges, etc. Great as the heat losses are in room-fires, it is admitted by all that it is our kitchen-ranges which are the great coal consumers and where improvement is most urgently called for. JOHN AITKEN.

Ardenlea, Falkirk, November 30.

THE trouble of cleaning referred to by Dr. Aitken has not in practice been found more than a minor inconvenience, and provision to make this easy is incorporated in the design. I agree with Dr. Aitken that, considering the radiating power alone, there is nothing in the colour, but it is desirable to employ an "enamel" stoved on so as not to smell if the temperature is raised, and I do not know that this can be done equally well with colour. While saving of fuel is most important and urgent at the present time, equable distribution of heat about a room has also its advantages, and it remains to be seen if this result brought about by my device will not itself more than compensate hereafter for the presence of the unobtrusive, if somewhat plain, heat interchangers—or "heavenly twins" as they were called by the first to benefit by their presence. C. V. BOYS.

A Mistaken Butterfly.

IN NATURE of September 5 last an Australian correspondent notes the attraction of the blue knob of a hatpin for a butterfly. When playing golf in Gulmarg (Kashmir) this summer I was frequently put off by a large butterfly settling on the ball just as I was making a stroke. I make a point of keeping my ball white and clean, and the butterflies evidently mistook it for a white flower. S. ROBSON.

Prince of Wales College, Jammu,
October 27.

CHEMICAL CORRELATION IN THE GROWTH OF PLANTS.

WHEN the apical shoot of a fir tree is broken off or injured, it is a familiar fact that one of the lateral branches below changes its direction of growth in order to take the place of the original apical shoot. The change of direction is accompanied by greater vigour of growth. These phenomena attracted the attention of Errera,[1] who suggested, as the reason why the lateral shoots do not tend to grow vertically while the apical shoot is intact, the possibility that the latter might produce inhibitory substances of a chemical nature which travel downwards to the other parts of the tree. Direct evidence was not then available, but the hypothesis has since received confirmation from certain experiments by Dr. Jacques Loeb, who appears to have been unaware of Errera's suggestion.

Although the phenomena are of general occurrence, Dr. Loeb found the tropical plant, *Bryophyllum calycinum*, an appropriate one for the purpose of investigation. The stem carries a series of buds, each in the axil of a leaf, while the leaves themselves are also provided with buds in notches around their edges. Under ordinary conditions all these buds are dormant. But they can be made to grow by various procedures. The common experiment of taking a willow shoot, cutting off the leaves and suspending it horizontally in moist

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[1] Brit. Ass. Reports, 1904, p. 814. "Conflits de préséance et excitations inhibitoires chez les végétaux," Bull. soc. roy. botan. belgique, vol. xlii., 1904; reprinted in "Œuvres Physiol. Gén.," p. 101. (Bruxelles, 1910.)

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